

NEWSLETTER #3

October 2021



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PROGRESS TOWARDS FEDERATED LOGISTICS
THROUGH THE INTEGRATION OF TEN-T INTO A
GLOBAL TRADE NETWORK

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Contents

EGTN Foundational Position Papers and Simulation Scenarios	2
Submitted deliverables	7
Attended events	7
Upcoming events	8



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EGTN Foundational Position Papers and Simulation Scenarios

PLANET's 3rd newsletter presents project's four Foundational Position Papers (PPs) for an Integrated Green EU-Global T&L Network (EGTN), which pave the way for EGTN's initial vision and the simulation scenarios for assessing its potential impacts. This newsletter builds on PLANET previous work published in [Newsletter #1](#) and [Newsletter #2](#), which presented, respectively, PLANET's vision and structure, as well as key emerging transport and trading routes/corridors and their implications.

PLANET's four PPs further analyse the main European trade routes and transportation trends, both at a macroscopic and microscopic level, by taking into consideration: trade -flows and - policies, emerging trade routes, infrastructure capabilities, connectivity performance of principle entry nodes and other parameters. Each PPs focus on a specific subject and their ultimate goal is to understand the impact of current and emerging routes on the existing EU transportation network (TEN-T), land interconnection issues of the TEN-T with networks outside EU, with particular interest in rail transportation, and, finally, the benefits of the potential adoption of Physical Internet (PI) concept and enabling technologies for more efficient and environmental friendly operations in T&L sector.

Furthermore, PLANET's PPs acknowledge that flows in the TEN-T are expected to change drastically over the upcoming years due to a plethora of factors, including technological advancements, geopolitical events or environmental changes and regulations. However, since the above factors and their consequences are difficult to predict and are not under EU control, there is a great amount of uncertainty regarding their realization, which has led to the use of scenario planning and analysis within each PP, based on the specific subject addressed in each document. The goal of envisioning future scenarios is identifying key-risk factors, parameters trends and assess their potential impact on EGTN.

Finally, the subsequent chapters delve into PPs research questions and main conclusions, as well as the simulation scenarios of PLANET's PPs.

Position Paper 1: Geo-economic developments impacting global corridors for trade

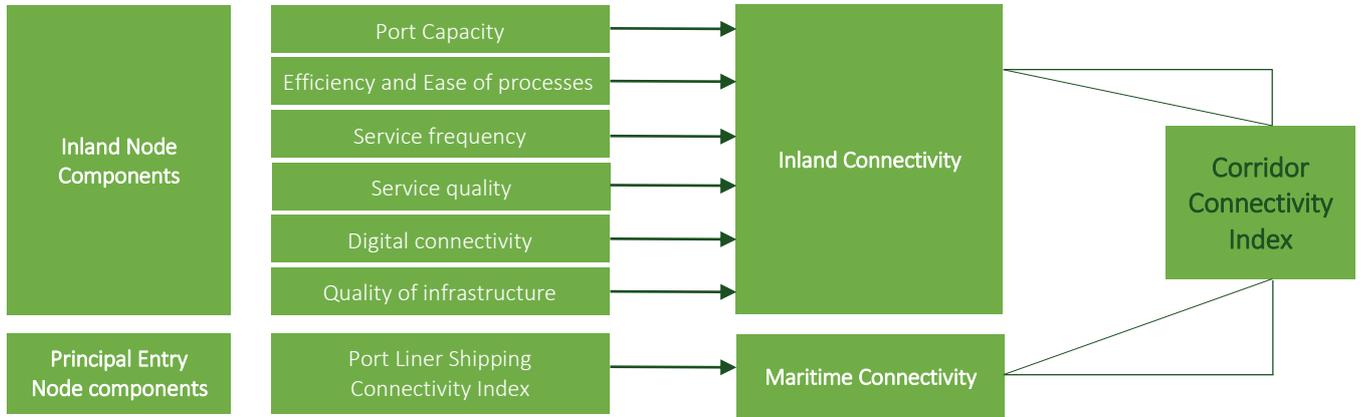
Research Question: *“What is the relation between geo-economics and new trade routes, what are the dynamics of these trade routes and how can we measure and monitor the impact on existing TEN-T corridors?”*

Trade flows and patterns to/from and within Europe are expected to change significantly over the next years, with the creation of new trade routes connecting Europe to Asia and, more specifically, with an emphasis on connecting Europe to China. The most important underlying geo-economic reasons for this phenomenon are: i) the trend for change in the current model of globalized production towards the regionalization of production, especially for middle-high end/strategic products; ii) the ‘One Belt One Road’ initiative, which consists of six economic corridors and includes both a maritime and a land connection to Europe; iii) environmental parameters related to the climate change (melting of Arctic ice, longer periods of drought); iv) Russia's ambitions to exploit the Arctic region, including a maritime route; v) Russia and India's intention to connect through the development of the international North-South corridor through Central Asia, which also bypasses the Suez Canal.

In order to track and monitor the dynamics and potential impact of emerging routes to TEN-T existing corridors, the PP suggest the usage of the Corridor Connectivity Index (CCI). Its goal is to measure and monitor connectivity

of principal entry nodes/inland nodes (see figure 1¹), and it can be applied as a barometer of changing trade flows. A higher CCI will suggest that it becomes more attractive to transport goods via this principal entry node/Inland node and, whereby, monitoring and comparing CCI values over time can be linked to new-trade routes.

Figure 1. Main dimensions of the CCI indicator



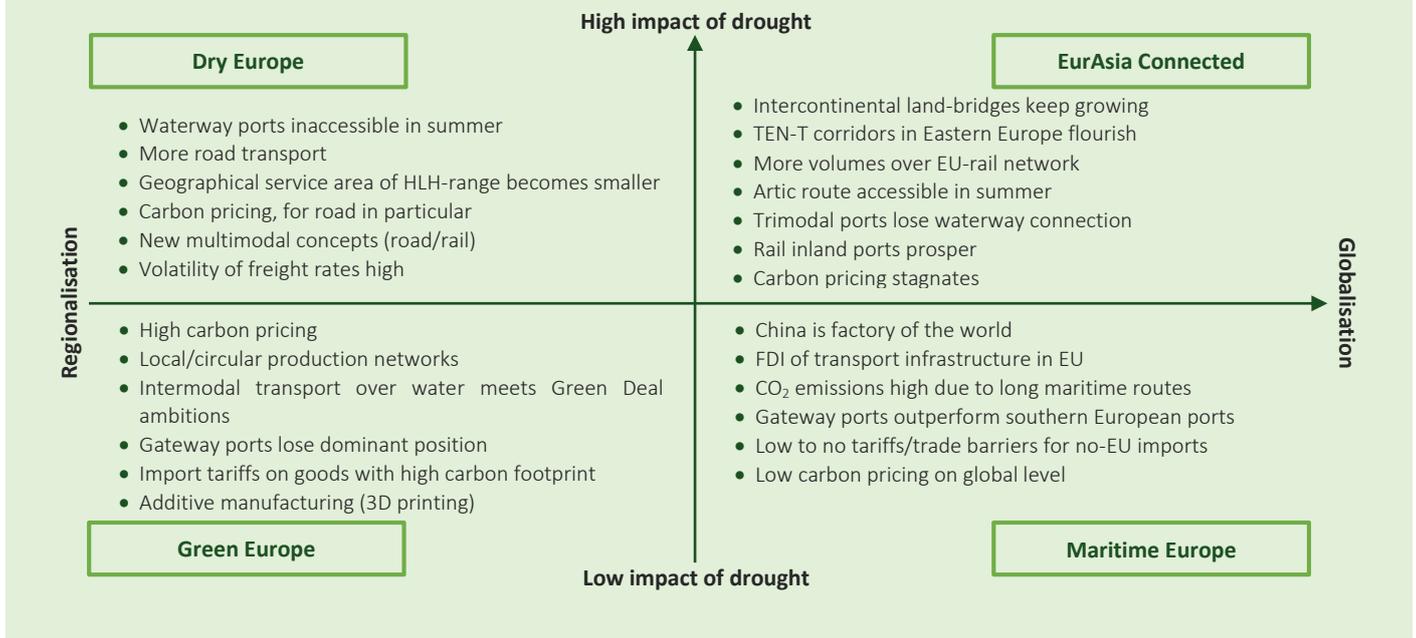
PP1 Scenarios overview

Aim

Identify multiple pathways for the development of node connectivity on the TEN-T network, depending on developments in the geopolitical and geo-economic playing field.

Scenarios

Dry Europe, Green Europe, Connected Eurasia and Maritime Europe. The four “alternative realities” identify multiple pathway for the development of nodes on the TEN-T network, as well as translated into parameters values which PLANET will use in its modelling capacity to study these implications for the TEN-T network up to 2035.



¹ An extensive definition of this indicator and its dimensions can be found in Position Paper 1.

Position Paper 2: New trade routes’ impact on TEN-T Corridors and nodes

Research Questions: “What are the underlying trends? What is the impact of new and emerging trade routes? How can the EU anticipate to manage these routes?”

The emerging new routes² (see [Newsletter #2](#) for further information) are expected to change freight flows and main entry points of trade and flows along the TEN-T network. This outcome is expected to add pressure on the current network and question its ability to serve these flows without avoiding congestion or other problems. In addition, further globalization of production, new global supply chains and further increases in global trade volumes, will steer focus for infrastructure development from hinterland connections of the main entry (maritime) points to inland connections, bridging the different regions of production and consumption. Finally, small network disruptions occurring outside the EU, catastrophic disruptions, such as currently caused by the COVID19 pandemic or natural/man-made disasters, could ultimately also negatively affecting transport performance within the EU and emphasize the need for robustness, resilience and flexibility of TEN-T network.

Therefore, the main finding of this PP is that **emphasis on infrastructure development may shift from hinterland to inland networks**. This will put pressure on current infrastructures, and may lead to creation of bottlenecks, congestion problems and capacity shortages. In order TEN-T network to adapt these challenges, substantial political effort will require updates to the legislation and how the updating and reporting is conducted, especially to include external EU countries to submit national implementation plans and reporting of KPIs compliance.

PP2 Scenarios overview

- Aim** Model the inter-Europe trade flows, i.e., the trade flows from the principal entry nodes and the European hinterland destinations
- Scenarios** PP2 will simulate 4 alternative scenarios until 2030 and 2050, according to the developments on 3 main pillars and in two states (high or low).

Year	Scenario type	Reference scenario	Specific Scenario’s		
			Exogenous developments	Rail evolution	Disadvantaged Regions (DR)
2030	High	Business-as-usual	High growth	High investment	Progress in DR
	Low		Low growth	Low investment	Decline in DR
2050	High	Business-as-usual	High growth	High investment	Progress in DR
	Low		Low growth	Low investment	Decline in DR

Scenarios description

The *first set of the model parameters* contain **Exogenous developments**, which include factors such as economic and demographic growth, which are the two most important factors affecting demand for goods. The High scenario combines relatively strong economic growth with relatively strong population growth, and the low scenario combines moderate economic growth with limited demographic development.

The *second set of parameters* are related to **Rail evolution**, more specific there are two possible states, one in which rail freight transport is highly efficient and attractive, resulting in many shippers opting for rail freight transport instead of other modes of transport due to lower costs an extensive rail network, infrastructure investments etc., while the alternative scenario provides insight into the consequences of the underdevelopment of rail freight transport.

Finally, Eastern Europe (**Disadvantaged regions**) is the gateway for rail transport to and from Asia. In this case is investigated what happens if the disadvantaged regions develop strongly or lag behind, this involves infrastructural development on the one hand, and socioeconomic development on the other.

² Although it should be pointed out that, especially the Arctic route and the International North-South corridors - despite both have significant advantages such as the bypassing of the Suez Canal and shortening the distance to Europe - there are many geopolitical and environmental parameters which may impede their realization.

Position Paper 3: Interconnections issues of railway transport corridors from and to Europe

Research Question: “What should future rail developments look like in order to improve the interconnectivity of the European transport network?”

The aim of this PP is to investigate the interconnections of the European Railway Network with its neighboring countries and continents, such as Asia and Africa. The basis of this paper is: i) the consolidation of the corridor descriptions of all TEN-T railway lines and Rail Freight Corridors relevant as key ‘nodes’ for intercontinental transport, with a focus on the Eurasian corridors; ii) the collection of basic infrastructure parameters (such as track gauges, total admissible train weight/length, transported volumes, etc.); iii) an inventory of the major stakeholders and institutions involved in intercontinental transport.

The main conclusions of this PP are that interconnection of the European rail transport corridors to the global network face many challenges around three key factors: 1) the poor interoperability of rail infrastructure causing operational problems and an increased handling and transit time, thus reducing the competitiveness of rail; 2) the low digitalization levels today in terms of the management of customs and commercial documents, hand in hand with the lack of data harmonization along the entire global corridors; 3) political and regulatory issues, with the most prominent being the subsidies to Chinese companies for transferring containers through rail which creates distortions in completion for EU rail companies, while regulatory problems include existing restrictions on the transportation of dangerous goods through the Chinese network and other. Concluding, solving the rail interconnectivity issues is a convoluted task requiring concentrated efforts in multiple levels, including the development of hard infrastructure and the implementation of operational solutions, supported by legal and policy initiatives, and international agreements.

PP3 Scenarios overview

Aim Identify how the aforementioned bottlenecks will affect the use of railway transport and its evolution, in the next 10 to 15 years, in door-to-door supply chains between Europe and Russia/China.

Scenarios Railway Interoperability, Political Framework and Digitalization, each scenario as described below projects different futures states for the key indicators under a different narrative.

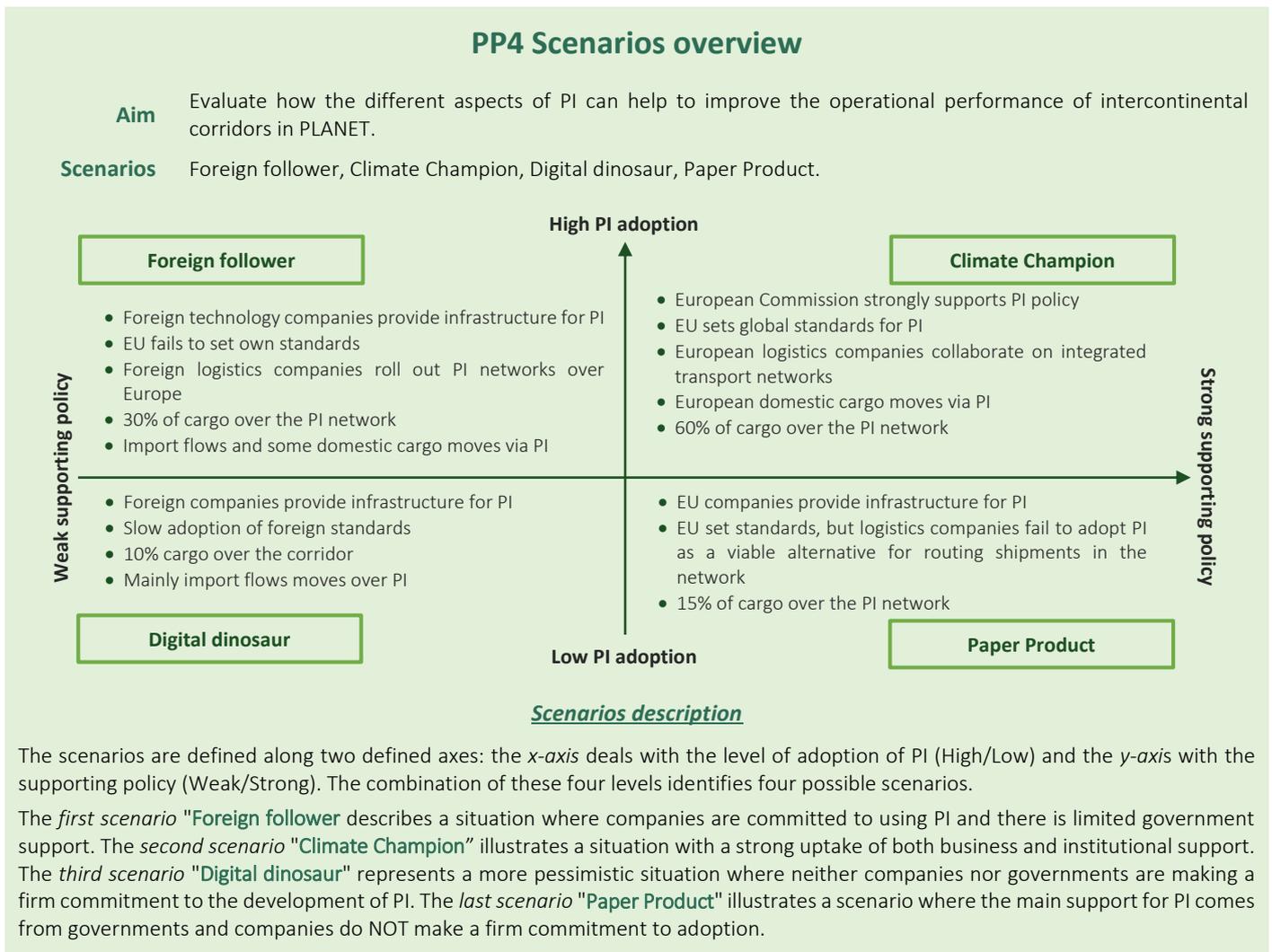
Scenario	Description	Levels	Initial key indicators
Railway Interoperability	The railway corridors are not yet fully interoperable and thus limiting a smooth transfer of trains/wagons/intermodal loading units between Europa and Asia	<ul style="list-style-type: none"> • <i>Poor interoperability:</i> AS-IS situation. • <i>Medium interoperability:</i> AS-SITUATION + partial interoperability (train length, axle load...) on some routes. • <i>Full interoperability:</i> all routes are fully interoperable. 	Number of trains/day/route, transit times and cost per unit.
Political Framework	The political context both in Europe and in especially in China, significantly affects the railway transport on the Eurasian routes.	<ul style="list-style-type: none"> • <i>Degraded mode:</i> the subsidies will only be allocated to Chinese companies; the dangerous goods are not accepted at all on the Chinese railway network – customs procedures are reinforced. • <i>Status mode:</i> AS-IS situation. • <i>Upgraded mode:</i> open subsidy schemes for all companies transporting goods from/to China – dangerous goods are accepted – simplified customs' procedures. 	Number of trains/day/route, transit times and cost per unit, number of loading units with dangerous goods, subsidies received per loading unit and number of produced documents.
Digitalisation	The European railway sector is submitted to regulations regarding data exchanges and digital platforms (for example TAF TSI). This scenario should evaluate the impacts of digitalization on the management of documents (customs and commercial) on the Eurasian routes.	<ul style="list-style-type: none"> • <i>Low:</i> current situation. • <i>Medium:</i> partial digital document management. • <i>High:</i> full digital document management. 	Number of paper documents versus digital documents and number of community platforms (business & authorities).

Position Paper 4: Transition towards the Physical Internet paradigm

Research Question: "What is the impact of PLANET logistics and transport concepts and technologies, such as Synchronodality, AI, IoT, Blockchain as contributing to the PI roadmap, on corridor development?"

Logistics networks are still highly fragmented, lacking vertical coordination, resulting in inefficient use of resources or duplicate efforts. Successful collaboration among the different transport and logistics actors requires two main levels of collaboration: (a) in planning operations; (b) on executing operations.

In this context, we should keep in mind that for enabling "physical" collaboration, i.e. sharing resources such as transport or storage areas, "digital" collaboration is required between the different companies for setting up and orchestrating the collaborative processes. The main barrier according to PI literature is stakeholders' reluctance toward sharing information and connecting to the common platform, while other reasons includes lack of certified open logistics service providers or lack of appropriate standards for data collection. To this end, PLANET utilizes security, provenance, and reliability enhancing technologies such as IoT, AI and Blockchain, for building trust between collaborating actors and facilitating collaboration between agents. Finally, PLANET investigates quantitatively, by modelling and simulation methods, the benefits of the progressive adoption of PI in terms of improved process efficiency (resource capacity, arrival times, congestion, etc.), increased freight transport capacity and reduced environmental impacts.



Submitted deliverables

These are the public deliverables you can find in our [website](#):

DELIVERABLE	WORK PACKAGE (WP)
D1.1. EGTN Foundational Position Papers and Simulation Scenarios	WP1
D1.2. Modelling & Simulation Capability	WP1
D1.4. Simulation based impact of new trade routes on the TEN-T and disadvantaged regions	WP1
D1.6. Legislation and EU policy to impact ECTN	WP1
D1.8. Simulation-based analysis of T&L and ICT innovation technologies	WP1
D1.10. EGTN Reference Specification v1	WP1
D 2.1. Open EGTN Platform Architecture v1	WP2
D 5.1. Stakeholder Analysis Report	WP5
D6.1. Project management handbook	WP6
D6.3A Initial Data management plan	WP6

Attended events

Progress towards Federated Logistics through the Integration of TEN-T into A Global Trade Network

#1 PLANET – Advisory Board Meeting
30 September 2021

The main objective of the Advisory Board is to offer advice and support on most relevant factors may influence the innovation management of PLANET, providing comments and recommendations to the project consortium.

During the 1st Advisory Board Meeting, after a short introduction round of all participants and the PLANET Project, the discussion focused on the four Position Papers drafted within PLANET Work package 1:

- Geo-economic dimension which drives the emergence of new trade routes to EU.
- Impact of these routes on the existing EU transportation network (TEN-T).
- Land interconnection issues of the TEN-T to networks outside EU concerning rail infrastructure.
- Emerging of the Physical Internet concept, potential to guide the EGTN.

Upcoming events

Progress towards Federated Logistics through the Integration of TEN-T into A Global Trade Network

#2 PLANET General Assembly Meeting
20 October 2021

Progress towards Federated Logistics through the Integration of TEN-T into A Global Trade Network

#2 PLANET – Advisory Board Meeting
21 October 2021

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